At the tanyard with which I am connected, we tan a large number yearly, including many cotton nets. Not only does it render them more durable, but in some cases, where wet nets have heated and become tender, their toughness has been restored by tanning. I cannot attempt to explain the chemical action which takes place, and, indeed, the still more important ones by which leather is produced are very imperfectly understood.

HENRY R. PROCTER

North Shields, Sept. 26

The Intended Engineering College

IN my letter on the above subject, I alluded to Mr. Mason's magnificent foundation of an educational institution in Birmingham, and by a queer inadvertence wrote the Christian name "Oliver"; and shall be much obliged if you will insert this correction of my mistake. It is Mr. *Josiah* Mason, the well-known pen manufacturer and founder of the orphanage and almshouses at Erdington, who is so liberally and judiciously enriching the Midland metropolis

W. MATTIEU WILLIAMS

The Haze Accompanying Auroral Displays

I DOUBT if the haze, seen before and during Aurora, has received sufficient attention. The beautiful displays which we in Canada have so frequently seen of late, have been well adapted to lead us to inquire into their cause; and I think in making observations, the beauty of the luminous portion has led us to overlook other things which are equally important.

On the night of April 15, 1869, we had a grand exhibition of Aurora at Toronto. It spread itself all over the heavens, forming a glorious canopy, filling the south as well as the north.

Previous to any auroral display, however, the atmosphere became thick and hazy; I was viewing the setting moon through a telescope, and though there were no clouds, I found the definition become extremely bad; I thought my breath must have got on the eye-piece, but soon found this was not the case. I then went outside, and on looking round, found the whole atmosphere full of haze. It had not the appearance of fog, but the whole air seemed thick and turbid, and shortly auroral columns commenced forming. This haze was visible for hours. Referring to this feature, Prof. Kingston says (*American Journal of Science*, July 1869, p. 65):—"Throughout the night, a generally diffused luminosity prevailed, such as is commonly seen with a full moon and hazy sky. This was evidently not occasioned by the moon, which was scarcely four days old, and was low in the horizon, but was part of the aurora itself, the brilliancy of whose more active features it greatly impaired." This haze is seldom seen spread in this way all around us; but it is usually seen as a bank in the north, and is surmounted by the auroral arch; stars can be seen through it, but it greatly dims their lustre. Prof. Loomis says:—"The slaty appearance of the sky, which is a common feature of great auroral exhibitions, arises from the condensation of the vapour of the air, and this condensed vapour probably exists in the form of minute spiculæ of ice or flakes of snow. Fine flakes of snow have been repeatedly observed to fall during the exhibition of auroras, and this snow only slightly impairs the transparency of the atmosphere without presenting the appearance of clouds. It produces a turbid appearance of the atmosphere, and causes that dark bank which in the United States rests on the northern horizon. This turbidness is more noticeable near the horizon than it is at great elevations, because near the horizon the line of vision traverses a greater extent of this hazy atmosphere. When the aurora covers the whole heavens, the entire atmosphere is filled with this haze, and a dark segment may be observed resting on the southern horizon."

Whilst approving of the professor's description, I must dissent from his explanation of the cause. This haziness is seen during our hot summer nights, as well as our cold ones; and I have seen it when snow-flakes would be out of the question in such a temperature. Many reasons leads me to regard this haze as cosmical, falling on our earth from without; but at present, I will call attention to the appearance only, reserving my explanation for a future time.

A. ELVINS

NOTES

IT is with very great regret that we have to announce the death, at the age of fifty-two, of Dr. William Allen Miller, Professor of Chemistry in King's College, London, and treasurer and vice-president of the Royal Society. Professor Miller's writings have earned for him a position in the literature of chemistry, from which he will be very greatly missed.

WE understand that Professor Allman has resigned the Chair of Natural History in the University of Edinburgh. It has long been felt that the subjects of Geology and Mineralogy which have hitherto been taught from this Chair are of such vast and growing importance and extent, that they can no longer be properly included in it when a successor is appointed. It gives us the greatest pleasure to state that Sir Roderick Murchison, who has already done so much for the geology of his native country, has munificently come forward with the offer of 6,000*l.* towards the endowment of a separate Chair of Geology and Mineralogy, on the understanding that on this, as on former occasions, the Government will supplement the private grant by an equal sum. Here then we have an admirable occasion for the Government to show itself alive to the importance of fostering the cultivation of those sciences on which especially the future welfare of the country must largely depend.

THE new Faculty of Science in University College, London, was opened on Tuesday last, by an inaugural address by Prof. A. W. Williamson, F.R.S. The discourse was devoted to an exposition of the importance of scientific method, and of the value of a scientific training, as an introduction even to the life of an ordinary man of business.

IN addition to his discourse to the Social Science Congress at Newcastle, Dr. Lyon Playfair delivered, on Thursday evening last, the inaugural address on opening the session of the Birmingham and Midland Institute. The subject of the lecture was announced as "The Inosculation of the Arts and Sciences;" and in its course the lecturer discussed the intimate union between science and labour. It is not science which creates labour or the industries flowing from it. On the contrary, science is the progeny of the industrial arts on the one side, and on the other of the experiences and perceptions which gradually attach themselves to these arts, so that the evolution of science from the arts is the first circumstance of human progress, which, however, quickly receives development and impulse from the science thus evolved. Industrial labour, then, is one of the parents, and science the child; but, as often happens in the world, the son becomes richer than the father, and raises his position. Apologising for the apparently pedantic form of the word, Dr. Playfair said he proposed to treat of the "inosculation" of arts and sciences, their junction with open mouths, as when two arteries join and mingle their contents. It will be seen that science does not depend upon facts alone, but upon the increase of mental conceptions which can be brought to bear upon them; these conceptions increase as slowly as the common knowledge derived from experience—they both descend by inheritance from one generation to another, until science in its progress becomes a prevision of new knowledge by light reflected from the accumulated common knowledge of the past. In the progress of time common knowledge passes into scientific knowledge. The amazing changes which have taken place since 1838 are due to our better conceptions of forces and their mutual relations and conversions. Formerly heat, light, electricity, magnetism, and chemical affinities, were thought to be separate and independent existences, not even related to each other. Now we know that forces are convertible and interchangeable. This knowledge has already given great stimulus to their application, and will do so more in the future. Further, we know that the primary source of nearly all the power on the earth is the sun above.

The publishing trade shows indications of its usual activity at this time of the year. Among the announcements of forthcoming works from the leading houses bearing more or less directly on science, we note the following. From Messrs. Longmans and Co. :—The Life of Isambard Kingdom Brunel, Civil Engineer, by Isambard Brunel, B.C.L. ; A System of Logic and History of Logical Doctrines, by Dr. F. Ueberweg, 1 vol. ; The Sun : Ruler, Light, Fire, and Life of the Planetary System, by Richard A. Proctor, B.A. ; Spectrum Analysis in its Application to Terrestrial Substances and the Physical Constitution of the Heavenly Bodies, familiarly explained by Dr. H. Schellen, Director der Realschule I. O. Cologne, translated from the German by Jane and Caroline Lassell, edited, with notes, by William Huggins, LL.D., D.C.L., F.R.S , 1 vol. crown 8vo., with coloured plates and other illustrations ; Select Methods in Chemical Analysis and Laboratory Manipulations, by William Crookes, F.R.S., &c., editor of the *Chemical News ;* A Handbook of Dyeing and Calico Printing, by William Crookes, F.R.S., &c., illustrated with numerous specimens of textile fabrics ; Text-Books of Science, a new series of elementary works on Mechanical and Physical Science, forming a series of Text-Books of Science adapted for the use of artisans and of students in public and other schools, in small 8vo., each volume containing about 300 pages. From Messrs. Macmillan and Co. :—The Sun, by Balfour Stewart, LL.D., F.R.S., and J. Norman Lockyer, F.R.S. ; The Beginnings of Life, including an Account of the present State of the Spontaneous Generation Controversy, by H. C. Bastian, M.D., F.R.S.; An Introduction to the Osteology of the Mammalia, by W. H. Flower, F.R.S. ; A Treatise on Magnetism, designed for the use of Students at the University, by G. B. Airy, Astronomer Royal ; New Volumes of the School Class Book Series—Elementary Lessons in Logic, Deductive and Inductive, by Prof. Jevons, and Elementary Lessons in Physics, by Balfour Stewart, LL.D., F.R.S. From Messrs. Rivingtons :—Exercises adapted to Algebra, Part. 1, by J. Hamblin Smith ; A Manual of Logic, or, A Statement and Explanation of the Laws of Formal Thought, by Henry J. Turrell. From Messrs. Blackie and Son :—A translation, by Prof. Everett, of Prof. Deschanel's Elementary Treatise on Natural Philosophy, Part 1—Mechanics, Hydrostatics, and Pneumatics, illustrated with a coloured plate and many woodcuts. From Messrs. Asher and Co :—Man in the Past, Present, and Future, from the German of Dr. L. Buchner, translated by W. S. Dallas, F.L.S. From Messrs. Churchill :—A Manual of Botany, by Robert Bentley, Professor of Botany, King's College, London, and to the Pharmaceutical Society (second edition) ; A Laboratory Text-Book of Practical Chemistry, or Introduction to Qualitative Analysis, a guide to the course of practical instruction given in the laboratories of the Royal College of Chemistry, by W. G. Valentin, F.C.S. ; Handbook of Volumetric Analysis, or the Quantitative Estimation of Chemical Substances by Measure, by Francis Sutton, F.C.S., Norwich (second edition, much enlarged).

The early publication is announced of "The Year-Book of Pharmacy," containing the proceedings at the yearly meeting of the British Pharmaceutical Conference, and a Report on the Progress of Pharmacy, which will include notices of all Pharmaceutical papers, new processes, preparations, and formulæ published throughout the world. It will be edited by Mr. J. C. Brough.

The Professor of Chemistry to the University of Cambridge will begin a course of lectures on the Experimental Laws of Heat on Monday the 17th of October. He will also give instruction in Chemical Manipulation on Mondays, Wednesdays, and Fridays, at 1 P.M., beginning on the 10th of October, at the University Laboratory, which will be open daily from 10 till 6 for the use of students.

The prospectus of the South London Working Men's College for the coming session includes classes in the following departments of Natural Science :—Chemistry, Physics, Animal Physiology, Geology, Metallurgy, and Applied Mechanics, as well as in Political Economy. The presence on the Council of the names of Professors Huxley, Fawcett, and Tyndall, Sir John Lubbock, and Dr. Cobbold, are a sufficient guarantee of the quality of the instruction given.

Professor Duncan, F.R.S., will commence a course of evening lectures on Geology, at King's College, London, on Monday, October 10th.

The first meeting for the session of the Royal Microscopical Society will be held at King's College, London, on Wednesday, the 12th inst., at 8 o'clock, when the following papers will be read by Dr. G. W. Royston Pigott, M.A. :—"On Aplanatic Illumination," and "On Aplanatic Definition, with Optical Illustrations."

A meeting of the Leeds Field Naturalists' Society will be held on Tuesday, October 11th, at 8 o'clock, at the Young Men's Christian Association, South Parade, to consider the advisability of holding weekly meetings during the winter session.

Owens College, Manchester, has lately received a very valuable donation to its large geological collection, in the shape of a collection of fossil Marsupials from Australia. This collection was to have been presented to the British Museum, but the donor ultimately decided to bestow it on Manchester instead.

The Jesuit College at Manilla, in the Philippine Islands, has established a meteorological observatory, with self-recording instruments, where records of earthquakes are made in that region so fertile of them.

A magnificent refracting telescope, with an object-glass of 25 inches diameter, is being constructed at the manufactory of Messrs. Clarke and Sons, Cambridgeport, Massachussetts, for the National Observatory at Washington. The money for this valuable instrument was voted by Congress last session, and amounts to 50,000 dollars, about 10,000*l.* It is believed that this telescope, when completed, will be one of the largest in the world ; meanwhile, it will take four years to finish it completely.

The closing of Paris deprives us of the communication of meteorological observations and the Registrar-General of the records of births and deaths. The next international congress should provide for the requirements of science.

The recent great summer-heat in America has been attracting great attention there. According to the records of Yale College, it has been the hottest summer for the last 92 years. "From July 10, to Aug. 15, 1870, the mean daily temperature was, at New Haven, 85°, and no season since 1778 has shown so many consecutive hot days. Our highest temperature this summer was (July 17) noted at 98°, and this has only been exceeded four times during the period above indicated at New Haven, the thermometer rising to 100° one day each year in 1784, 1800, and 1845, whilst in 1798 it reached 101°." This will be very interesting to compare with the temperatures ascertained this year in England.

In the aquarium of the Dublin Zoological Gardens there are several specimens of the blind fish (*Amblyopsis spelæus*) lately brought from the Kentucky caves by Prof. Mapother. The small specimens, being very transparent, show the vertebral column, the heart, and the optic bulbs very distinctly. In the largest there are dark red spots over the optic bulbs, probably due to their having been kept in an iron vessel, which may have given colour for a rudimentary pigment membrane.

IN the last part of the *Zeitschrift für Biologie* is an interesting paper by Dr. Camerer, on the locality of the sense of taste, or, as he expresses it, "On the dependence of the sense of taste on the part of the oral cavity irritated." His experiments have been conducted on himself, his wife, a lady friend, and six peasant girls. He employed solution of common salt, quinine, sugar, and sulphuric acid as the exciting agents, and localised their action by pouring a drop or two into a small open tube that was pressed on different parts of the tongue, the determination of the test fluid being required without the subject of the experiment being made acquainted with the nature of the solution used. It is well known that there are three kinds of papillæ on the tongue—the conical, the fungiform, and the circumvallate. Dr. Camerer finds that the sensibility of different parts of the tongue depends essentially on the presence and on the number of the fungiform papillæ. The fungiform papillæ, he finds, are most abundant near the apex of the tongue, they are less numerous at the edges of the tongue, and disappear near the root. There are no papillæ on the under surface of the tongue. The latter part he finds to be destitute of gustatory sensibility, whilst the sensibility is most acute when the papillæ are most closely aggregated together. He states also that when a strong solution has been tasted of any of the above substances, the delicacy of the sensibility is impaired for twenty-four hours. Other direct and carefully conducted experiments showed that the gustatory sensibility resided in the fungiform papillæ themselves and not in the parts adjoining.

ACCORDING to the *Food Journal*, in Belgium the butchers use laurel oil on the door-posts and window-frames for the purpose of keeping away flies, with great success. So simple a contrivance would be a great boon to the *habitués* of our eating-houses and confectioners, and would be useful to every housekeeper. The emanation from minced laurel leaves is rapidly fatal to all small insects.

WITH a view further to promote the cultivation of the Rhea fibre, the Viceroy of India has sanctioned an expenditure temporarily of 8*l.* per month, at Shaharunpore and at Dehra Dhoon, a hill station.

THERE are now in London specimens of iron manufactured for the first time in Peru by the Peruvian Government Commission from magnetic iron ore, found within twenty miles of Lima, and from fair anthracite taken from a seam sixty feet thick at sixty miles from Lima. The Government is awaiting the development of the railways now in progress. Renewed efforts are being made to enlist English capital in the restoration of the silver mines.

MR. ADAMS, the Secretary of our Legation in Japan, has been rendering good service in doing all he can to protect the silkworm in those countries by his influence and advice, which are willingly received. At the last advices he had returned from a lengthened tour in the interior, on which he will report. In Japanese are some illustrated works on silk culture.

ON CERTAIN PRINCIPLES TO BE OBSERVED IN THE ESTABLISHMENT OF A NATIONAL MUSEUM OF NATURAL HISTORY[*]

IT having been now finally determined that the Natural History collections of the British Museum shall be removed from their present site to South Kensington, to form the nucleus of a National Museum of Natural History,[†] it appears to me that the principles upon which the proposed new institution are to be established and conducted, are well worthy of the special and most serious attention of the British Association for the Advancement of Science. The inauguration of a National Museum of Natural History by one of the nations that have contributed most largely to the advancement of the natural sciences, is an event that is not likely to recur very often. If the opportunity thus presented be properly taken advantage of, and the new institution started upon sound principles of administration and arrangement, there can be no doubt that a most material impetus will be given to the progress of natural science in this country.

Under these circumstances I think I need hardly apologise for troubling the section with a few remarks upon certain points which appear to me to be most essential to be observed in the establishment of a National Museum of Natural History. These, I trust, will at all events provoke discussion, and induce some of the many distinguished naturalists present at this meeting to turn their attention to this most important subject.[*]

The energies of our rulers, especially in these troubled times, are too fully occupied with ordinary politics to allow them to bestow much care on such a matter, and unless it be forced on their attention by the British Association, or in some other authoritative manner, the result will be, I fear, that the system of administration now followed in the British Museum as regards the Natural History collections will be transplanted along with the collections themselves, and the excellent opportunity of a grand reform, which may never again present itself, will be utterly wasted.[†]

The remarks which I propose to offer to the section on this subject may be divided into three heads. First, I will say a few words concerning what appears to me to be the best mode of government of the proposed National Museum of Natural History. Secondly, I will speak of the form of building which in my opinion ought to be adopted; and lastly, of the arrangement of the collections within that building.

I. *Of the form of Government of the National Museum of Natural History.*

On this part of my subject I shall make but few remarks, having regard to the fact that, in common with many other of my fellow naturalists, I strongly committed myself on this point some years ago and have in nowise changed my views since that period. In the memorial, of which I hold a copy in my hands, and which was presented to the Chancellor of the Exchequer in 1866 having been signed by 25 leading members of the Royal, Linnean, Geological, and Zoological Societies, it will be found to be stated that in our opinion the chief administration of the National Museum of Natural History should be entrusted to one officer, who shall be immediately responsible to some member of the Government. Those who are acquainted with the present mode of administration of the Natural History collections in the British Museum will, I am sure, readily agree to this proposed reform It will be recollected that the government of the British Museum is vested by Act of Parliament in a body of fifty trustees, consisting principally of great officers of state, and of nominees of certain families whose ancestors have contributed to the heterogeneous contents of that building. Amongst these fifty trustees there are but two or three that are in any wise interested in Natural History. Their secretary and

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[*] Read before Section D at the meeting of the British Association at Liverpool, on September 16, 1870.

[†] On the 3rd of August last a vote of 6,000*l.* was proposed in the House of Commons by the Chancellor of the Exchequer to clear the ground "for the erection of a Natural History Museum" on the site of the International Exhibition at South Kensington, and carried, after a division.

[*] For account of this discussion see p. 465.

[†] In the "bill to enable the Trustees of the British Museum to remove portions of their collections," prepared and brought in by the Chancellor of the Exchequer in 1862, it was proposed to be enacted that the trustees might remove the natural history collections to South Kensington and certain pictures to the National Gallery. But, in a subsequent clause, it was proposed to be added that "*except in so far as was therein before expressed, nothing therein contained should affect the rights, powers, duties, or obligations of the trustees of the British Museum.*" At that time, therefore, it was clearly intended to continue the rule of the trustees over the natural history collections when removed to South Kensington.